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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/089,358	05/13/2002	Horst Berneth	Mo-7059/LeA 33,071	1359

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EXAMINER	
ANGEBRANNDT, MARTIN J	

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/089,358	BERNETH ET AL.	
	Examiner	Art Unit	
	Martin J. Angebranndt	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/29/08*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-9,12-24 and 27- 30* is/are pending in the application.

4a) Of the above claim(s) *19-24,27 and 28* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-9,12-18,29 and 30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-5,7-9,12-24 and 27- 30* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. The response of the applicant has been read and given careful consideration. Rejections of the previous office action, not repeated below are withdrawn. Responses to the arguments appear after the first rejection to which they are directed.

2. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

I. Claims 1-18 and 29, drawn to optical recording media and use thereof.

II. Claims 19-23 and 27-28, drawn to various azo based monomers and polymerization thereof.

III. Claim 24, drawn to azo based polymer compositions.

3. The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The claims fail to make a contribution beyond that of the prior art as evidenced by the references marked "X" or "Y" in the PCT search report of December 14, 2000. In particular any feature which unites them fails to confer patentability.

4. During a telephone conversation with Aaron Pries on March 7, 2006 a provisional election was made with traverse to prosecute the invention of group I, claims 1-18 and 29. Affirmation of this election must be made by applicant in replying to this Office action. Claims 19-28 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

The applicant is requested to acknowledge the election in the next communication.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-4,7-9,12,13,15-18 and 29-30 are rejected under 35 U.S.C. 103(a) as obvious over Elmasry '819 and Berneth et al. WO/ 9744365, in view of Andruzzi et al., "holographic gratings in azobenzene side chains polymethylmethacrylates", Macromol. Vol. 32(2) pp. 448-454 (01/1999), Howe et al. '545 and Savant et al. '221.

Berneth et al. WO 97/44365 teaches the use of laser powers of 10^3 to 10^7 mJ/m^2 (0.1-1,000 mJ/cm^2) with times of 10^{-15} to 10^{-3} second for writing patterns using polarized light. (page 5/lines 4-15). The spot sizes may be 10 nm to 20 microns (page 5/lines 17-19). Examples of useful dye include those disclosed on pages 6-20, which are pendent to the polymer backbone. Exemplified dyes are shown in the examples. The thickness of the layers may be 0.1-500 microns ([page 23/lines 24+). The use of these in holographic, analog or digital recording processes is disclosed. (24/26-25/20). In example 1, the polymer illustrated on page 27 is applied to a 2x2 cm glass plate by spin coating and pre-exposed using a light box for two hours (section 1.1, page 27). This was then inscribed using an argon ion laser operating at 280 mW with a laser spot size of 7-8 microns, an inscribing energy "E" of 10^6 mJ/m^2 (100 mJ/cm^2) at a scan rate of 23.8 m/sec (section 1.3, pages 28-29). The dyes are those embraced by the language on pages 7-21 describing pendant chromophores and anisotropic moieties.

Elmasry '819 in example 9 has a glass substrate coated with aluminum and a polymeric azo dye having the structure shown is coated to a thickness of 0.15 microns. This is exposed to a

laser modulated by an acousto-optic modulator. The exposure conditions are for beam diameters of 0.5 to 50 microns, with 1 micron or less being used in the examples. The scanning speeds result in 45-55 ns exposures and the laser output at the recording layer is 1-150 mW, preferably 2-25 mW as in the examples. (6/17-36). The readout of the deformation is optical (5/61-6/11). Sample 1 in table 1 describes an exposure of 0.01 ergs/dot (1×10^{-9} J/spot) which assuming a 1 micron spot size is 0.127 J/cm^2 at a laser power in the 2-25 mW range.

Howe et al. '545 teaches thermal deformation of dye/binder recording media, where the pit depth is 55 nm (12/40-44). The media have a substrate coated with a reflective layer and a the dye/binder layer. as shown in figure 3. The use of $\pi/2$ pit depths is disclosed. (12/55-63)

Andruzzi et al., "holographic gratings in azobenzene side chains polymethylmethacrylates", Macromol. Vol. 32(2) pp. 448-454 (01/1999) teaches that the reordering of the azobenzene compounds formed from the monomers on page 448 can be used to form gratings with relief features in the 90-1340 nm range as evidenced in table 4 (page 453).

Savant et al. '221 in examples XIII-XX has a glass substrate and a polymeric azo dye coated to a thickness between 20- and 35 microns. This is exposed to a laser modulated by an electro-optic modulator which varies the polarization and is readout using polarized light and detecting the polarization of the reflected light.

It would have been obvious to one skilled in the art to one skilled in the art to modify the cited example of Berneth et al. WO/ 9744365 by adding a reflective layer as taught by Elmasry '819 and Savant et al. '221 and further to use modulation means, such as the acousto-optic modulator taught by Elmasry '819, in place of the EOM with a reasonable expectation of being able to record data and read it out using the techniques disclosed by Elmasry '819 and/or Savant

et al. '221 with a reasonable expectation of successfully forming the recited depression based upon the teachings of Andruzzi et al., "holographic gratings in azobenzene side chains polymethylmethacrylates", Macromol. Vol. 32(2) pp. 448-454 (01/1999) and Howe et al. '545.

Alternatively it would have been obvious to modify the cited examples 4 and 5 of Elmasry '819 which assuming a 1 micron spot size records at 0.127 J/cm^2 at a laser power of 20mW and reading the information by using the azobenzene polymers, such as those taught by Berneth et al. WO/ 9744365 with a reasonable expectation of forming features of ~1 micron in diameter and depths of more than 10 nm based upon the teachings of Andruzzi et al., "holographic gratings in azobenzene side chains polymethylmethacrylates", Macromol. Vol. 32(2) pp. 448-454 (01/1999) and Howe et al. '545. Further it would have been obvious to use the readout processes taught by Elmasry '819 and/or Savant et al. '221

Elmasry '819, Savant et al. '221 and Howe et al. '545 teaches readout of deformation recorded media, with Elmasry '819 specifically relating to azo polymeric dyes. In addition the deformation by melting as taught by Elmasry '819 and Howe et al. '545, the orientation of the azobenzene will also contribute to the change in topography as taught by Andruzzi et al., "holographic gratings in azobenzene side chains polymethylmethacrylates", Macromol. Vol. 32(2) pp. 448-454 (01/1999) which uses polymeric dyes similar to those of Berneth et al. WO/ 9744365 and contributions from birefringence as discussed by Berneth et al. WO/ 9744365. The chemistry is relatively unimportant, the (pendant) chromophore must absorb the light to cause the deformation and the polymer (binder or polymeric backbone) controls the sensitivity based upon the Tg of the resulting composition. The mode of readout discussed in the instant application is clearly discussed by Elmasry '819 and particularly Howe et al. '545, who teaches

the use of interferometric thicknesses for the recording layer to optimize the contrast. If the applicant wants to limit the recording to optical profileometers, then the claims should state this. (see specification at page 39).

7. Claims 1-5,7-9,12-18 and 29-30 are rejected under 35 U.S.C. 103(a) as obvious over Elmasry '819 and Berneth et al. WO/ 9744365, in view of Andruzzi et al., "holographic gratings in azobenzene side chains polymethylmethacrylates", Macromol. Vol. 32(2) pp. 448-454 (01/1999), Howe et al. '545 and Savant et al. '221, further in view of Ninomiya et al. '092 or Akashi et al. EP 669548.

Ninomiya et al. '092 teach LC recording layers provided on polymeric substrates (12/35-41). The overcoating of the LC polymers layer with a surface protective layer is disclosed to provide resistance to damage from abrasion, heat and the like (12/60-65). Useful materials for the surface protective layer include UV curable resins and the like including various acrylates (13/1-58).

Akashi et al. EP 669548 teaches in example 1, an LC materials applied to an Al coated polyethylene substrate and overcoated with a UV curable layer. (pages 11-12.) The use of azo dyes is disclosed with respect to the formulae a-k and the fact that X and Y may be N=N as discussed in page 5. The use of azobenzene is also specifically described. On page 4 at line 26. Useful protective layers are described. (9/6-9).

It would have been obvious to one skilled in the art to modify the media rendered obvious by the combination of Elmasry '819 and Berneth et al. WO/ 9744365, with Andruzzi et al., "holographic gratings in azobenzene side chains polymethylmethacrylates", Macromol. Vol. 32(2) pp. 448-454 (01/1999), Howe et al. '545 and Savant et al. '221 by adding a protective

layer know to be useful with LC materials, such as those disclosed by Akashi et al. EP 669548 or Ninomiya et al. '092 with a reasonable expectation of forming a useful azo based LC recording medium which is protected from mechanical damage. Further it would have been obvious to use other substrate materials, such as the polymers disclosed by Ninomiya et al. '092 or Akashi et al. EP 669548, in place of the glass substrate exemplified by Berneth et al. WO/ 9744365 with Elmasry '819 and Savant et al. '221with a reasonable expectation of success based upon the disclosure of equivalent functionality.

The examiner relies upon the response above to address the arguments.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J. Angebranndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Martin J Angebranndt/
Primary Examiner, Art Unit 1795

Martin J Angebranndt
Primary Examiner
Art Unit 1795

6/4/2008